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LIGATURE OF THE

LEFT COMMON ILIAC ARTERY,

BEING THE

SECOND OPERATION IN IRELAND,

AND THE

FIRST SUCCESSFUL CASE OF IT.

BY

WILLIAM HARGRAVE, A.M., M.B. Univ. Dub.,

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Condensed from Notes regularly and accurately taken by WILLIAM WHEELER, Resident Pupil.

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LIGATURE OF THE LEFT COMMON ILIAC ARTERY,

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Sergeant George K——, ætat. 43 years, was admitted into the City of Dublin Hospital on the 20th December, 1864. On examination, a large pulsating tumour was seen in the left iliac fossa immediately above Poupart's ligament, and dipping into the pelvic cavity, accompanied with the usual aneurismal bruit. It was of a triangular form, from four and a half to five inches wide in the transverse diameter, the base parallel to the ligament, its apex extending to the common iliac artery which appears to be dilated. The patient is of a robust frame, and never complained of any illness till the present time.

Previous History.—As he was walking about six months ago with a boot that did not fit him—*i.e.*, his left foot being slipshod, so that it threw the weight of his limb on the forepart of his foot, in the evening he felt a numbness in it. This continued with some intermissions, and in a few days he first perceived a swelling in his abdomen. Matters remained thus for five months, the numbness continuing, but the swelling increasing, at the end of this time he went to a fair, on his return home after a fatiguing day he perceived his leg swollen. Having shown it to his medical attendant he was recommended to go to the City of Dublin Hospital. He was given beef-tea for his dinner.

December 21st: ℞ Aquæ camp. ʒi.; trœ digitalis, ℥x.; eth. chlorici, ℥vi. Ft. haustus. Cap. unus ter in die.

Observations and recapitulation of the treatment prior to having recourse to the operation.—The result of operations on this vessel have been so unfavourable, that in thirty-two cases recorded and tabulated by Dr. Smith, in the *American Journal of Medical Sciences*, vol. xl., N. S.,

1860, but six recovered. My case makes the number thirty-three, and adds one to that of the recoveries. These statistics induced me to have recourse to every variety of treatment by compression, if possible to avoid operating; also from considering the effect, proximate and remote, of suddenly and permanently arresting through the natural channels the direct supply of blood to one-half of the pelvis and the entire of the inferior extremity, so much so that the limb would, in all probability, perish before the feeble collateral circulation could be established to afford the requisite support. In addition to these impediments to success should be added the probability of consecutive congestions of the heart, the lungs, or of the brain, by the sudden and permanent arrest of the course of so large a quantity of blood. All these circumstances when fairly estimated increase the responsibility of the surgeon and the uncertainty of the operation. Compression was consequently carried out in the most sedulous and attentive manner; 1st, instrumental; 2nd, digital; 3rd, position by extreme flexion of the thigh in the hip-joint; 4th, compression on the distal side combined with that on the cardiac side of the tumour; 5th, by direct pressure on the aneurism by means of a seven-pound weight.

The treatment by compression was commenced on Monday, December 26, 1864, and was continued with much perseverance and regularity by Dr. Carte's compressor for six weeks, acting upon the primitive iliac, the course of which was easily and readily defined. When properly applied, it stopped the aneurismal pulsation completely, the tumour becoming flat and flaccid. Diet was regulated with every care and attention as follows, and at stated periods:—Breakfast—Bread, 2 oz.; butter, 2 oz.; tea, 2 fluid oz. Dinner—Broiled mutton, 3 oz.; bread, 3 oz; potatoes, 3 oz. Supper—Bread and butter, of each 2 oz.; weak tea, 2 oz. For the first three days of this treatment he took træ digitalis gut. decem ter in die, being ninety drops in three days; but it so weakened the heart's action that it was discontinued. Ordered wine one ounce and a half. For a time that this method was followed, the patient was placed under full doses of opium to narcotism; no benefit whatever was derived from it.

Chloroform was subsequently administered, for hours being fully under its influence, equally unprofitable in any way affecting the tumour.

Hydriodate of potash in five-grain doses ter in die was prescribed and taken for many days, in accordance with successful cases recorded by Bouillaud, with no benefit.

Acetate of lead and opium in three-grain doses three times daily; in forty-eight hours productive of Burton's characteristic blue line on the gums, which was well marked. It was discontinued owing to the colic caused by it. After a time it was again ordered, and again abandoned from colic. Of all the treatment medically adopted the lead was the only agent that appeared to produce any effect on the aneurism, giving some feeble evidence of a partial circumferential coagulum being deposited at its external and superior boundary.* He had administered the træ ferri muriat. in ten drops three times a day for many days; no benefit whatever from it.

Carte's compressor having failed, as already indicated, I availed myself of Mr. L'Estrange's for compressing the abdominal aorta above its division into the primitive iliac and azygos sacral arteries for nearly a fortnight; though acting well, no utility whatever from it. Digital pressure was next had recourse to, and for fifty continuous hours I would affirm that no blood flowed into the aneurism. This pressure was maintained in the most sedulous manner by the educated, well-trained, and untiring care of the pupils of the hospital, whose zeal, activity, good feeling, and kindness in supporting my efforts to benefit this patient is beyond my praise; no advantage from it, still it was persevered in for five continuous days without any satisfactory result.

The double combined compression—that on the cardiac side of the tumour and on the distal side of it on the femoral artery—was of no benefit to the aneurism, but in my judgment was injurious to the patient, as it increased the œdema of the inferior extremity. The direct pressure on the aneurism by means of a seven-pound weight was of no advantage whatever. During the entire of the treatment by compression the continued and sedulous application of ice to the tumour was of no avail. Nothing now remained but the operation.

The following table expresses very accurately the times and manner of compression up to a short time prior to the operation:—Dr. Carte's apparatus from December 26th to January 9, 1865. Conical leaden seven-pound weight from January 10th to February 11th. Carte's

apparatus reapplied for twenty-four hours and forty minutes without intermission, February 13th. This apparatus with the seven pound leaden weight to February 26th. From this period instrumental and digital pressure to March 10th. From this date L'Estrange's clamp applied, combined with digital compression, to the 18th of April.

The medical treatment comprises the liquor pernit. ferri, substituted for the sol. ferri perchloridi, it changed for hydriod. of potash, which was discontinued, and the acet. plumbi with opium ordered. The limited diet prescribed on his admission was augmented considerably one month after it, and continued so up to the operation; in fact, full diet, alternating with wine and porter, according to circumstances.

The operation was performed on Saturday, April 29, 1865, in the presence of many of the surgeons of the city, also of Drs. Hadaway and O'Flaherty, Inspector-General and Deputy Inspector-General of Military Hospitals in Ireland.

Operation ten a.m.—The patient was well under the influence of chloroform before and during the operation. An incision was made from the point of the last rib, slightly curving downwards to Poupart's ligament, mid-distance between the anterior superior spine of the ilium and symphysis pubis about eight inches long, the superficial fascia and the three broad muscles were next carefully divided from below upwards and from angle to angle of the incision. Any hæmorrhage was venous, with the exception of the internal branch of the circumflex ilei vessel, which *was sliced*, a ligature was tied on each side of the opening, and the vessel divided between them. The transversalis fascia was perfectly *cleansed* and *free from any blood;* it was very strong, the smallest possible portion of it was pinched up in the forceps, and found by its transparency to be free of the peritoneum, the fascia was divided on the director for the entire extent of the wound, the peritoneum was freely exposed, and the colon seen beneath it. There was much less bulging of the viscera through the wound than I expected. The peritoneum was removed from the iliac fossa to the mesial line of the body with the greatest facility, I would say with more ease than in the dead subject; it carried with it firmly adherent the ureter. The aneurismal sac occupying the external iliac artery remained almost

in a state of repose—*i.e.*, did not project into the wound, as has occurred in similar operations, it was well defined at the cardiac or proximal end, and corroborated what was ascertained before the operation of dipping deep into the pelvic cavity, perhaps compressing the external iliac vein, so accounting for the great œdema of the entire of the left limb. The common iliac artery was now exposed and visible to the naked eye, the vein was not equally apparent. The separation between these vessels was easily effected by slight scratches with my finger-nail, which I had previously sharpened by filing the inner edge, serving by so doing as a blunt knife, and could scarcely commit any mischief, a hempen ligature was then passed under the artery from within outwards, on compressing it on the aneurismal needle all pulsation in the aneurism completely ceased, *it becoming so flat as to have disappeared.* The genito-crural nerve was embraced by the ligature in the first instance, from *which it was excluded.* The extreme sensitiveness of this nerve astonished me. It was twice very gently touched to free it from the ligature, on each occasion it roused him to perfect consciousness from a deep anæsthetic sleep, and the artery tied about half or three-quarters of an inch above its division into the external and internal iliacs.

Prior to the operation a doubt passed through my mind as to the effects of the instrumental and digital pressure upon the peritoneum, rendering it more or less adherent to the iliac artery and vein, also as to the more or less intimate adhesion of these vessels to each other. This doubt was completely set at rest by the great facility with which the peritoneum was removed, both from the iliac fossa and the vessels, also from the little impediment I experienced in separating them from each other so as to permit the needle and ligature to pass between them. It may be instructive to remark on this step of the operation a few days before it I operated upon a thin adult female; the artery and vein were intimately adherent, in passing the needle between these vessels I wounded, as I thought, the common iliac vein, as blood flowed; on the instant, it was withdrawn and a fresh place selected, which allowed the needle to be passed without any injury, the ligature was tied, the artery and vein were subsequently removed to examine what injury was inflicted on the vein, it was laid open and was found to be uninjured. The vein which had been wounded was a vas aberrans, in close contact

with the common iliac one. In contrasting this operation with that on the dead body, which I have performed some forty or fifty times during my professional opportunities, what struck me as so remarkable and exceptional was the great facility I experienced in removing the peritoneum from the iliac fossa to uncover the artery and vein, also from the extreme ease in passing the needle between them. Though furnished with a numerous variety of aneurismal needles to surmount this anticipated difficulty, the ordinary one, with the handle a little longer than usual and the eye circular, as near to the point consistent with strength, rounded well off in the smoothest manner, afforded every facility for passing the ligature under the artery. It was made for me by O'Neill of Henry-street, a surgical cutler who is *au courant* with all the surgical improvements of the day.

The wound was then dressed with metallic sutures, strips of adhesive plaster, the limb carefully enveloped in cotton wadding and flannel, and the man placed in bed.

Before the operation the pulse was firm, full, and 80 in the minute.

Observations on the operation.—The incision selected afforded the greatest facility in bringing the vessel into full view, it also showed the ureter attached firmly to the external surface of the peritoneum, altogether free of the artery. I experienced very little or any inconvenience from the protrusion of the intestines into the wound, though prepared with retractors of various sizes and kinds. The best were the hands of my assistants, completely superseding all the others, from what I experienced in this operation as to retraction and maintaining the peritoneum and contained intestines away, and kindly protected from injury of any kind. I would say no retractors were equal to the hands of intelligent and trusty assistants.

As already mentioned, the aneurismal sac did not project into the wound, nor in any way add to the depth of it. The iliacus internus and psoas magnus muscles were also well brought into view. The little inconvenience experienced by the intestines but slightly projecting into the wound, I attribute to two causes: 1st, the Thursday previous to the operation the bowels were freely opened by pil. rhei co. gr. x., followed in some hours by a Seidlitz powder, and three hours before the

operation an enema of full quantity with some oil was administered by the long tube, which completely emptied the rectum and sigmoid flexure of the colon. 2nd. To the advantage of the administration of chloroform, so judiciously given by my young friend Mr. Hewitt, and so carefully and continuously maintained by him during the operation, which placed the system in absolute repose, rest, and quietude, *with complete relaxation of all the abdominal muscles*, even the diaphragm—an incalculable benefit.

The comparative indistinctness of the iliac vein I attribute to it being compressed by the aneurismal tumour, which passed over it into the pelvic cavity and prevented it being in any way distended by the returning blood to the heart. This compression of the vein also explains very satisfactorily the œdema of the entire of the left inferior extremity, which was two inches greater in circumference than the right one on Thursday, or forty-eight hours before the operation. Until the operation was being performed, I attributed the œdema in part to the distal pressure upon the femoral artery as it emerged from the aneurism which had been applied for many days before the operation.

In performing this operation all the steps were taken in reference to securing the common iliac artery, and in place of seeking for it from the guidance of the external iliac, I sought it directly from its own anatomical relations. By a very simple proceeding the projection of the viscera into the wound was prevented by gently turning the patient slightly on his right side, when they glided and rolled over into the right iliac fossa, and caused no embarrassment whatever in the subsequent steps of the operation.

On applying my finger upon the artery before tying it, the rapidity of the course of the blood through it was most remarkable, accompanied by a constant whiz, whiz, whiz, the sensation of friction was also most remarkable, as if caused by very minute grains of very hard sand. If the friction which I felt under very moderate pressure is the normal condition in the arteries during the circulating torrent, the value of the lining coat in preserving them uninjured against friction is not generally appreciated or known.

In place of giving the daily reports as noted in this case, it will be equally interesting to record the principal symptoms as the *résumé* of what

was observed. Three hours after the operation the pulse rose to 88 full, from being 80 before it was performed; no pain in the limb, but slight numbness referrible to the great toe; some arrow-root was given to him at six p.m. Complained of great aching and burning pain around the ankle-joint, particularly at the external malleolus; feels the limb very warm and very heavy. ℞ Liq. opii sed. Bat. gut. xx., sp. am. arom. gut. x., ether. chlorici gut. x., aq. distil. ʒi. ft. haustus statim sum.; to have ice and whey. Eleven p.m.: Much relieved; had some sleep; pulse 100, not as full as at two p.m. Rept. haustus anod. April 30, second day, eleven a.m.: Very tranquil night, scarcely any pain about the ankle; feels weight of limb less than yesterday; little thirst, had a severe fit of sneezing, and was alarmed by a show of blood from the wound, but no evidence of hæmorrhage. Countenance less haggard than yesterday; pulse 120, not full; passed water frequently during the night. To have beef-tea, rice.

Five and ten p.m.: A most favourable day; no pain or uneasiness; weight of limb less; pulse 120 full; micturated freely; inclined to sleep. Haust. anod. si opus sit.

May 1st: Very quiet night; slept well on the draught; pulse 116, full; wound dressed, with a *free discharge* of sanguineous serum, and traces of pus in it. To have chicken broth and oranges.

May 2nd: A good night; pulse 120; copious discharge of puriform fluid from the wound, the result of Cellulitis, with a strong feculent odour from the superior part of it, and agglutination at the inferior angle of it. The tumour smaller but very soft; a blue vein appearing in the mesial line of the abdomen, extending from the xiphoid cartilage of the sternum to the pubis. Diet as yesterday, to have a cathartic enema, P. B. vespere.

Ten p.m.: Enema acted well, bringing away much flatus; the pain has returned in the ankle, of the same character, but not so severe; pulse 120; the anodyne increased by five drops; œdema of the thigh diminishing.

3rd May, fourth day: A tranquil night; some pain still about the ankle, describing accurately the course of the filaments of the external saphenic nerve; pulse 120, soft; wound dressed, the edges in close apposition, a large quantity of brownish coloured serum easily pressed from



the inferior angle of it, and free from feculent fœtor. Had an anodyne draught at four a.m. To have chicken broth, beef-tea and rice; perspiring. Ten p.m.: Pain in the ankle continues, numbness and sensation of weight of limb less; some pain from lying on the right trochanter; relieved by a water-cushion. Repeat the anodyne.

4th May, fifth day: Easy night; pulse 112; no pain of limb; œdema rapidly subsiding; full discharge of dark coloured serum from the wound; incision diminishing in length; tumour less prominent, contents more firm; no pulsation; still of the same dimensions; abdominal veins more evident; perspiration less than yesterday; countenance assuming a haggard appearance; four ounces of sound claret added to his diet.

Ten p.m.: A dark, large solid alvine evacuation, with much pain, but great relief following it; abdomen slightly tympanitic.

From this date till the 8th of May, and the *ninth day* from the operation, the brown-coloured serum was succeeded by *large quantities of laudable pus* from the wound, which was daily dressed; the diet and claret wine continued; the anodyne of Battley's sed. liquor. sometimes twice in the night. To relieve the perspiration, the syrup of cinchona (Donovan) in half-drachm doses in cinnamon water was ordered; he suffered occasionally from an over-distended bladder, requiring the catheter No. 9; the urethra perfectly free; tumour diminishing in size. This day *pulsation was detected in the aneurism*, feeble but quite evident, more so *immediately above Poupart's ligament, some indication of an artery pulsating in this locality;* the pulsation was unaccompanied by any bruit or vibratory thrill. Pergat in omnia medicamenta.

From this period, the 8th, the daily reports can be condensed into the following: commencing sensation in the foot; can move it and is inclined to move it; free purulent discharge from the wound; the upper half uniting and united permanently; complains of burning pains at the upper and external part of the patella; return of pain in the ankle; this patellar pain was very distressing to him; bowels moved by cathartic enema with sp. terbinthinæ. The pulsation in the aneurism ceased on the thirteenth day after the operation, being present from the ninth to this date. Scarcely any discharge from the wound; bladder occasionally requiring to be relieved by No. 9 catheter; getting more power over

the limb; œdema lessening; the extensor tendons on the dorsum of the foot well defined; nocturnal rest good, but assisted by the anodyne.

20th May, twenty-first day from the operation: Ligature firm and fixed upon the artery; countenance cheerful; pulse 88, full, round, and bounding.

21st May, twenty-second day after the operation: Ligature apparently protruding from the wound; at ten p.m., the pulsation returned more evident than at any time since the ninth day after the operation; still neither bruit nor vibratory thrill in it. From this date nothing much worthy of note was observed, except the intermission in the pulsation, almost always best marked in the vicinity to Poupart's ligament; co. pil. rhei occasionally required to regulate the bowels.

28th May, twenty-ninth day after the operation: I was much gratified by being able to bring away the ligature; not a drop of blood appeared; it was as strong and sound as the day it was applied; the arterial loop would admit but an ordinary small sized probe. This fact proved the success of the operation on the artery.

From this period all apprehension as to secondary hæmorrhage was removed, and the report on the thirty-first day after the operation states, scarcely any discharge from the wound, which gapes much at the inferior part of it, owing to the action of the abdominal muscles drawing the internal edge to the mesial line, which was in part prevented by appropriate dressing. On readjusting the flannel roller and cotton wadding on the limb, the external edge of the foot, and the integuments in relation to the little toe and corresponding half of the metatarsal bone presented a deep ecchymosed appearance, and was perfectly cold, which he did not perceive; the œdema gone except a little puffiness about the external ankle, and the limb much atrophied.

This appearance too plainly announced that the powers of the circulation were unable to maintain the vitality of these parts; he was ordered bark and ammonia, phosphate of iron in pill, and port wine substituted for the claret to meet his desire. From June 3rd to the 9th, forty-first day, he was gaining power over the entire of the extremity, feeling it as strong as he ever did; but anomalous symptoms occasionally were present, as neuralgia of the rectum, allayed by opiate suppositories, occa-

sional retention of urine, some vomiting, relieved by hydrocyanic acid in effervescence, and the gangrene attacking the great toe; while the aneurism was evidently smaller, still occasionally exhibiting pulsation, but no bruit or thrill. Up to June 13th, forty-fifth day from the operation, though expressing himself "as being quite strong and fit for walking," with full power over the toes, the foot had never recovered sensation from the time of the operation, and the gangrene was extending to the other toes, perfectly dry, in fact mummifying them, and strictly limited to the phalanges, the aneurism slowly diminishing under well-regulated compresses, but at irregular intervals pulsating in silence. He was attacked with purging and occasional involuntary discharges from the rectum, but in small quantities, checked by starch enema and trœ opium. His spirits good and sanguine as to restoration to health. Report states in June 15th, complains of much uneasiness about the anus, very painful when he sits up; a small superficial fissure was detected, one on the anterior and one on the opposite side of it, both touched with the solid nitrate of silver.

On this day he was taken to very comfortable lodgings in Sandymount, without any distress, expressing great delight at the change of air and scene. For the first eight or ten days every thing promised well for recovery, spirits good, strength returning, walking about his bedroom with the assistance of crutches, fissures of the anus healed, retained power over all his toes, but the dry gangrene indelibly marked, and no fœtor, a line of demarcation appearing accurately parallel to the metatarso-phalangeal articulations. Has had some diarrhœa, with involuntary alvine discharges, controlled by chalk mixture, kino, trœ opium. and starch opiate enemata. 28th June, sixtieth day from the operation: Improving in strength; moving well about on crutches; wound filling up; diarrhœa less, but a lurid, dark-red blush appearing on the dorsum of the foot. From this date the gangrene extended on the foot, both on the dorsal and plantar surface, of the moist character, with some fœtor, which was entirely checked by dressing with powdered charcoal. He was given bark, ammonia, opium, capsicum, and camphor; œdema of the leg extending up to the hip-joint.

July 3rd, sixty-fifth day from the operation: It was noted, I have been much disappointed by the symptoms presented by this patient since

his removal to the country, now nineteen days; no permanent improvement from change of air, and the weather magnificently fine; tumour slowly diminishing, but the contents still fluid near Poupart's ligament.

July 5th: Brought to the hospital; virtually no permanent improvement, while a large pelvic abscess presenting in each nates, freely communicating from side to side between the rectum anteriorly, and the sacrum and coccygeal bones posteriorly, from which, by puncture, twelve to fourteen ounces of thin, fœtid pus of a feculent odour flowed, mixed with gases; the abscess was opened in each nates. ℞ Decoct. cinch. ℥v., trœ cinch. co. ℥i., chlor. pot. ʒi., acid. mur. dil. ʒi., syrup. cort. aurant. ʒiv., trœ opii ʒi., ter, horis. ℞ Sulp. quinæ, gr. xxx., camp. gr. xviii., pil xii. cap. ii., unam sing., dose decoct. cinch.

7th, sixty-ninth day: Quiet night; abscess discharging; freely injected or washed out with a solution of permanganate of potash; pulse fuller, but he is much prostrated.

8th, seventieth day: Restless night; continued drain from the abscess—very fœtid; gangrene not extending; aneurism diminished in size and getting hard. When the abscess was injected with the solution of permanganate of potash, he suffered more pain than yesterday. Ten p.m.: Ordered mur. morph. gr. ½, to be repeated.

9th, seventy-first day: Arterial hæmorrhage at seven a.m., from the abscess in the right pelvis, arrested by liq. fer. perchlor. Found him very weak and chilled; wine and stimulants rallied him.

10th, seventy-second day: Passed an uneasy night; no hæmorrhage: took forty-eight ounces of wine yesterday. Tumour reduced to a very small size; the wound very flabby, and not inclined to heal; line of demarcation on the whole circumference of the tarsus well marked, exposing the extensor tendons and plantar fascia. Ten p.m.: Rambling; pulse frequent and small; great discharge from right nates, of a rusty colour, not very fœtid. ℞ Sp. am. arom. liq. Hoffman anod., sp. lavand co., sp. chloroform and camp. julap.

11th, seventy-third day: Smart arterial hæmorrhage at ten a.m. from the right nates, but little blood lost; arrested by compress and liq. ferri perchloride. Gradually sinking, and expired about nine p.m.

Post-mortem examination by Mr. Tufnell and Mr. Croly.—An incision was

made through the inetguments from above the umbilicus to the symphysis pubis, and a second incision from the same point to the anterior superior spinous process of the ilium. The muscles and fascia transversalis were next divided ; the intestines were adherent in the left iliac fossa, bound down by firm bands of lymph, evidently the result of inflammation. The intestines being drawn up the fascia iliaca was exposed, covering the iliacus internus muscle; the ureter was observed crossing the anterior surface of the common iliac artery, just at its bifurcation. The aneurismal tumour, which was soft and fluctuating to the touch, measured five inches by two and a-half, behind and to its outer side, lay the anterior crural nerve flattened and expanded. The abdominal aorta was exposed as high as the origin of the inferior mesenteric branch ; it presented a normal appearance as regards size ; an inch above its bifurcation into the common iliacs a calcareous deposit, about the size of a four-penny piece, was seen protruding through the coats of the artery, it occupied the right side of the vessel. The left common iliac artery (that on which the ligature was applied) was much smaller than the corresponding artery of the other side ; there was a fibrinous clot in it, just below its origin from the aorta—the vessel was severed by the ligature half an inch above the bifurcation into the internal and external iliacs. On passing a probe through the internal iliac into the common iliac, it was stopped by the adhesion of the vessel at the distal side of the ligature, the same occurred on passing a probe through the aorta into the common iliac. The common iliac vein was closely adherent to its artery, and the external vein was pressed upon by its artery. Femoral artery and vein healthy and of natural size. Iliac fascia unusually dense, and closely bound to the vessels; a large oval lymphatic gland occupied the left side of the common iliac artery, which was seen during the operation of a bluish colour. The pelvic cavity was filled with unhealthy pus, the pelvic bones sound, and not indented by the tumour. Internal epigastric artery slightly enlarged. A probe passed through it into the aneurismal sac touched a soft fibrinous clot. Walls of sac thin.

The aneurism was egg-shaped, the larger end downwards and a little inwards, measuring five inches in length, three and three-quarters in depth, and extended from about one inch from the origin of the external iliac artery, *which was enlarged* to within one and a-half inches of the

profunda covering the external iliac vein for about two inches of its course externally and posteriorly. The tumour, on being laid open for the entire of its extent, contained at its two superior thirds, a very soft, greyish fibrinous clot, but not distending it, in the inferior third was a soft, black blood deposit, scarcely to be considered a coagulum, being so friable. The aneurism communicated with the external iliac vein by a well-defined oval opening of about one quarter of an inch in diameter, situated a little below the middle of the tumour on its internal and posterior aspect. The epigastric, slightly enlarged, could be traced backward to the same opening the arterio-venous on the internal and posterior part of the aneurism, *and seemed to form, prior to its communication with the aneurism, a small cavity capable of containing a bean, which was filled with fluid blood.* By this examination the disease I had to contend with was not true aneurism, but that of aneursmal varix (or arterio-venous aneurism), in this case being a spontaneous formation (in contradistinction to the traumatic variety), which has been recorded by Bransby Cooper, Perry, and my late colleague Professor Porter, affecting the femoral vessels, being a primitive disease, the result of thinning of their coats. This rare variety was surmised early in February, for, combined with a well-marked bruit de soufflet, there was also a most remarkable vibratory thrill which was occasionally so loud and strong as to mask the proper aneurismal bruit; although from the phenomena indicated by the stethoscope no doubt remained on my mind, which was often expressed to the class, that there was more in this affection than a simple aneurism; the surmise being completely cleared up by the post-mortem examination presenting a well-marked complication of the direct communication between the vein and artery, and still more complicated by the direct entrance of the epigastric artery into the inferior part of the aneurism. The specimen is in the Pathological Museum of the Royal College of Surgeons, so well described and displayed by our curator, Dr. John Barker.

Observations.—After reading the disclosure made by the post-mortem examination, so accurately noted by my colleagues, the result of the operation was most satisfactory, the ligature having acted in the most efficient manner, when the aneurism was laid open and its true path-

ological character seen, revealing as it did the disease of aneurismal varix, which frequently presents so much difficulty in the successful treatment, in this complicated example affording difficulties insurmountable to effect a cure by operative surgery. Would any surgeon be justified, even after having ascertained the true character of the disease; first, to secure the common iliac, then to tie the external where it emerged from the aneurism, which would have failed unless the epigastric was also secured by ligature which carried the blood direct into the sac, as established by the post-mortem examination, and was the principal vessel for carrying on the collateral circulation to the inferior extremity, causing the feeble and silent pulsation so often observed in the aneurism after the operation; or, would he more heroically extirpate the entire of the disease with the vein and tie the ends of it and of the artery, if it could be performed, what would have been the condition of the circulation in the inferior extremity after such a proceeding? The manner in which the epigastric artery communicated with the aneurism showed the stream of blood divided between it and the limb—the extraordinary fact elicited by this was the length of time intervening between the operation and the incipient mortification being thirty-one days, when the supply of blood was in such small quantity to nourish the limb for this comparatively lengthened period. This case must be considered a most exceptional one in relation not alone to the pathology, but also to the difficulties which the surgeon would have to encounter and to surmount for successful treatment; it will also serve as a beacon to those who follow the high mission of conservative surgery to consider and carry out what may be the successful practice, which will afford me the greatest gratification and pleasure. In this case the disease was not stationary, the tumour gradually increasing under every kind of compression; the enlargement of it was in no way checked till the artery was tied, which completely and permanently arrested its further increase, establishing, in certain cases, the superiority of the ligature over compression; it is well for surgery that we have the ligature always in reserve, from the time of its application feeble efforts were made to form a fibrinous deposit at the superior part of the tumour, while the slightly enlarged epigastric by the collateral circulation fed the inferior part of the aneurism with blood, which, twenty hours after death, presented an unadhesive clot

and some in a fluid state. Still, from the appearances presented in the aneurism, though gangrene had attacked the foot as high as the tarsus, which was being arrested by a well-defined line of separation, I am strongly inclined to the opinion this patient would have permanently recovered with the partial loss of his foot but for the formation of the very large pelvic abscess, which was formed in a few days, announced by no constitutional premonitory symptoms, none but some trifling pain referred to the nates, three or four days before his death. It may be asked, what caused this abscess to form so silently, I might say secretly, and to be of such magnitude in so short a time? The only solution presented to me for explaining this occurrence is, that the blood in a healthy estimation was below par, consequently more liable to be affected by debilitating causes, such as gangrenous purulent absorption, and thus giving rise to the extensive pyæmia and gangrenous abscess which caused his death—in fact, a blood disease. It may be objected to the treatment of this case, that the compression was too long continued before proceeding to operation; but be it remembered, that the success of treatment by compression varies considerably; in twenty successful cases the time varied from sixty hours to eight months, the average being nineteen days.*

From the experience gained in this case, i[n] any other in which it would be prudent to have the ligature applied to the common iliac artery, after having given both instrumental and digital compression one month's trial, in case of failure, I would then proceed to the operation, which was delayed so long for two reasons—one was to give the fullest trial to compression, the other was that the collateral circulation would have been better developed, no such result followed, except a small increase in the diameter of the epigastric artery. The practice of surgery appears to be experiencing a remarkable change in the controlling of arterial hæmorrhage by other means than by the ligature. From the position which I have the honour to hold in the School of the Royal College of Surgeons, I cannot, without much more experience than we at present possess, supersede this valuable and well-tested means of commanding hæmorrhage, in favour of acupressure, the catgut, lead, metallic, silk, and

* System of Surgery, by Holmes, vol. iii., p. 418.

others ; we have now the *hemp ligature*, which will supersede all others, for the firm way in which it remains on the artery, the complete absence of irritation, and no alteration in its strength or soundness.

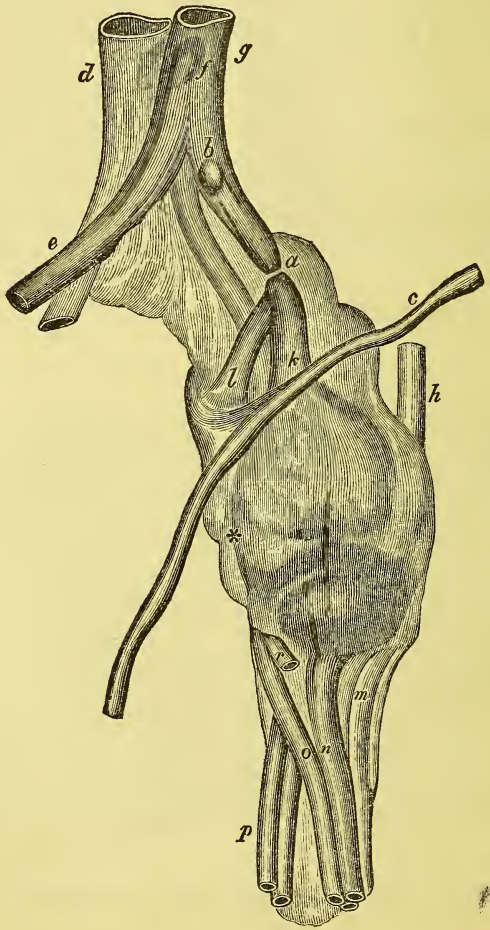
In conclusion, I may record that the subject of this most rare and important case is of historic interest, having served in the 22nd Regiment of Infantry, in the conquest of Scinde, under Sir C. Napier ; he was one of the chosen few who accompanied their chief to take the celebrated fortress of Imaur Ghur, held by the Ameers situated in the desert, eight days march from the head-quarters of the army ; during the march it is stated that some of the men slaked their thirst by drinking their urine, their supply of water having been exhausted before coming to the citadel. This feat of endurance, privation, valour, and conquest has but one feeble parallel in military warfare, which occurred in Africa during the Roman Republic, when Marius entered the Libyan desert to take Capsa, the march to it was neither so long nor the heat so great as in Seinde.*

References to the woodcut explanatory of the condition of the parts as exhibited by the post-mortem examination : *a.* Clean and defined section of the artery by the ligature ; *b.* fibrinous clot in the left common iliac artery, immediately below its origin from the aorta, obliterating the canal ; *c.* ureter thrown down to show the site of the ligature ; *d.* vena cava ; *e.* right common iliac artery ; *f.* calcareous deposits protruding the coats of the aorta to the right side, the size of a four-penny bit ; *g.* abdominal aorta ; *h.* anterior crural nerve, enlarged and flattened ; *k.* external iliac artery enlarged, terminating in and forming the aneurism. The shading of the tumour indicates very accurately by colour the portion of the aneurism which contained the fibrinous clot, and the clot formed solely by the blood, carried directly by the epigastric artery into the aneurism ; * the asterisk indicates the place of the communication between the artery and vein constituting the aneurismal varix ; *l.* internal

* Napier's History of the Conquest of Scinde : Sallust in the Jugurthine war.

iliac artery; *m.* crural nerve emerging from beneath the aneurism; *n.* femoral artery; *o.* femoral vein; *p.* profunda artery and vein; *r.* epigastric artery enlarged, entering into the inferior part of the aneurism.

The woodcut, by Mr. Oldham, graphically displays the pathological specimen.



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